

Durham Research Online

Deposited in DRO:

15 October 2013

Version of attached file:

Accepted Version

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Crampton, P.E.S and McLachlan, J.C. and Illing, J.C. (2013) 'A systematic literature review of undergraduate clinical placements in underserved areas.', *Medical education.*, 47 (10). pp. 969-978.

Further information on publisher's website:

<http://dx.doi.org/10.1111/medu.12215>

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A systematic literature review of undergraduate clinical placements in under-served areas

Paul E S Crampton, John C McLachlan, Jan C Illing

Abstract

Context- The delivery of undergraduate clinical education in under-served areas is increasing in various contexts across the world in response to local workforce needs. A collective understanding of the impact of these placements is lacking. Previous reviews often take a positivist approach by looking only at outcome measures. This review addresses the question: What are the strengths and weaknesses for medical students and supervisors of community placements in under-served areas?

Methods- A systematic literature review was carried out by database searching, citation searching, pearl growing, reference list checking, and use of own literature. The databases included MEDLINE, EMBASE, PsycINFO, Web of Science, and ERIC. Search terms used were combinations and variations of four key concepts exploring GP primary care, medical students, placements, and location characteristics. The papers were analysed using a textual narrative synthesis.

Findings- The initial search identified 4923 results. After removal of duplicates and screening of titles and abstracts, 185 met the inclusion criteria. These full articles were obtained and were assessed for their relevance to the research question, fifty-four were then included in the final review. Four main categories were identified: student performance, student perceptions, career pathways, and supervisor experiences.

Conclusions- This review reflects the emergent qualitative data, as well as quantitative data used to assess initiatives. Under-served area placements have produced many beneficial implications for students, supervisors, and the community. There is a growing amount of evidence regarding rural, under-served areas but little in relation to inner-city, deprived areas, and none in the UK.

Context

Although the current model of undergraduate placements is predominantly hospital based,¹ students are increasingly placed in community environments where populations are under-served.²⁻⁴ The primary driver for this change is seen as a workforce planning issue with concerns raised about insufficient future general practitioner (GP) numbers.⁵ However, a collective understanding of the impact of these initiatives is lacking.

The operational principle under investigation is clinical education in an area that does not usually provide such experience to medical students. Articles frequently refer to the area using transferable terms such as 'non-traditional'⁶⁻⁸ or 'displaced training environments'.⁴ The terms 'under-served' and 'rural' are often used interchangeably yet depending on the local context they may be distinct.

The prominent issues: lack of student interest, lack of student exposure, and difficulty in access to healthcare, persist for areas including rural and urban, and with higher levels of socio-economic deprivation. Within this review the term 'non-traditional' will generically label initiatives but specific terms will be used where appropriate.

Community placements aim to give students enhanced exposure to the local patient demographic hence they are often generalist in nature, in primary care settings over long periods. They often occur in the curriculum when students have choice over what subjects to study. The terms 'primary care' and 'generalism' relate to the content of the placements. A primary care clinician is defined as someone "who provides integrated, accessible healthcare services and is accountable for tackling a large majority of personal healthcare needs, and practising in the context of family and community."⁹ The term 'generalism' is used in regard to dealing with undifferentiated illness and the widest range of patients and conditions.¹⁰ An increasingly common undergraduate community approach is to teach several disciplines in parallel rather than block rotations; patients are seen over multiple clinical encounters enabling concurrent learning; known as a 'longitudinal integrated clerkship (LIC)'.¹¹

A small number of reviews have investigated components of clinical placements in under-served areas.¹²⁻¹⁷

Ranmuthugala *et al.*¹⁶ reviewed the impact of rural placements in GP practice. Whilst Universities with preferential admission of students intending to be rural GPs are successful in this respect, the benefits of placements are inconclusive. The influence of particular aspects of rural training programmes (in terms of nature, timing, frequency, and duration) on impact and uptake of rural practice is unknown. Studies fail to distinguish length of exposure and level of entry to medical schools.

Rabinowitz *et al.*¹² investigated American initiatives to address the undersupply of doctors in rural areas. Eight medical schools demonstrated a positive impact in training students to become future rural physicians.

Barrett *et al.*¹³ reviewed research from North America and Canada into the impact of rural placements on medical students between 1966 and 2009. The most common outcome considered was career choice (51% of 72 studies). Of these, most reported an association between experiencing rural training and choosing a primary care career. Practice location was the second most common outcome, 31% of studies reported experiences in a rural setting predicted future employment. Grades were

reported in 24% of studies, and most demonstrated equivalency between students with rural experiences and those without. The article suggests that the most effective methods of rural training, optimum rotation length, and timing of the experience should be explored further.

A recent valuable review of LIC outcomes suggested they are an effective pedagogical alternative to traditional block rotations however there was little consideration of learning in different contexts and placement length.¹⁷

Existing reviews found positive outcomes which support the replication of the initiatives, but the explanations are mainly at a surface level and tend to favour quantified outcomes. This review builds on the previous literature,¹²⁻¹⁷ informing educationalists, policy makers, and those who are seeking to implement a similar initiative in a local context. The study looks wider than previous reviews as global papers are considered and it reflects both quantitative and qualitative approaches to report why as well as what.

Research question

What are the strengths and weaknesses for medical students and supervisors of community placements in under-served areas?

Objective: To systematically identify all informative, published evidence concerning undergraduate community placements in under-served areas

Method

The efficacy of under-served area placements was systematically explored using various search techniques (Table 1).

Table 1 Search techniques:¹⁸

Technique	Notes
Database searching	See Appendix A for search example
Reference list checking	Check references of included papers for additional papers
Citation searching	Check if selected papers have been cited by more recent papers
Pearl (article) growing	Use key paper index terms to identify additional papers
Use of own sources	Literature already known by the research team

The databases searched included: MEDLINE, EMBASE, PsycINFO, Web of Science, and ERIC. Search terms used were combinations and variations of four key concepts exploring: GP primary care, medical students, placements, and location characteristics (Table 2).

Table 2 Search terms broken down by concept

Concept	Terms
<i>GP primary care</i>	GP OR "General Practice" OR "General Practitioner" OR "Primary care practitioner" OR "Primary care" or "Primary healthcare" OR "Family Medicine"
<i>Medical students</i>	"Medical students" OR undergraduate OR student* OR "medical training" OR "Medical education" OR curriculum

	OR trainee OR Medic
<i>Placements</i>	Placement* OR program* OR “longitudinal clerkship” OR attachment* OR internship OR “extended placement*”
<i>Location characteristics</i>	Under-served OR deprived OR difficult OR rural OR remote OR inner-city OR urban OR indigenous OR poor OR underprivileged OR destitute OR community OR isolated

* explode category terms

The following limits were applied to the search-
Not: Nursing OR Dentistry OR Pharmacy
Date range: 1991 to 2011
Language: English

Inclusion and exclusion criteria

Informative empirical studies providing conceptual and contextual knowledge about exposure to under-served areas were sought (Fig. 1). If initiatives were general community placements they were excluded as it was unknown if there was a GP shortage or difficult conditions that related to students training in such environments. Studies reporting medical programmes that had an extensive under-served area focused curriculum were only included if they described the placement in sufficient detail to allow analysis. No outcome variables were predefined as this was exploratory rather than hypothesis-led research.

Figure 1 Inclusion and exclusion criteria

INCLUSION criteria for papers:

- Primary healthcare / generalism context AND
- Undergraduate medical education AND
- Exposure to under-served areas (including but not limited to rural, remote, isolated, urban, deprived, inner-city) AND
- English language AND
- Academic publications AND

Is the study about either:

- Experiences of students OR
- Experiences of GP supervisors / preceptors

EXCLUSION criteria:

- Not medical students
- Pre-clinical experiences (i.e. first two years of medical degree)
- Postgraduate exposure
- Commentaries, discussions, editorial comments
- Exposure to specialties
- Initiatives that aim to increase workers in under-served areas primarily through financial means

Data extraction and analysis

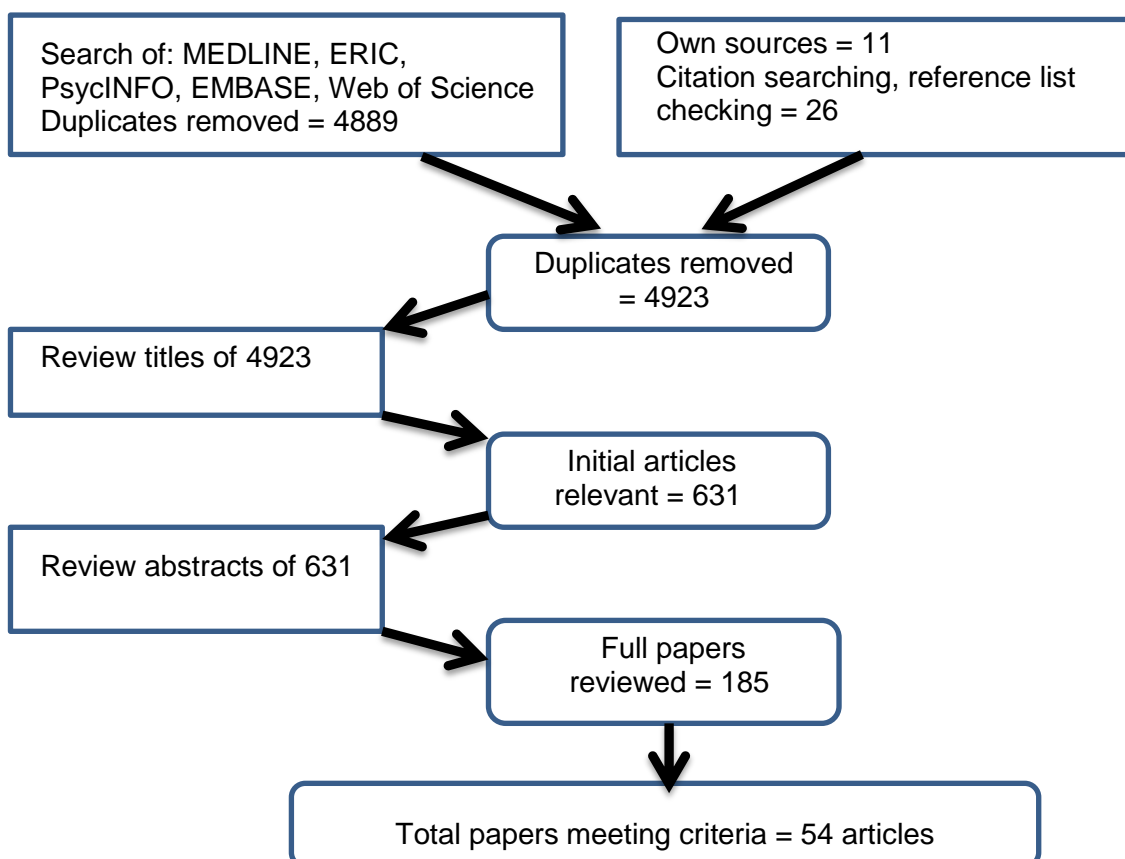
After reading key articles (prior to conducting the review) it was acknowledged the literature was based on quantitative and qualitative data therefore a textual narrative synthesis¹⁹ was deemed appropriate to appraise intervention efficacy. This approach allows an encompassing appreciation of studies whilst describing gaps in the literature.²⁰ Analysis consisted of three stages: papers grouped into categories, study commentaries produced, followed by a sub-group synthesis.

A template was devised to extract relevant data to the research question. This included: year and country, university, geographical area, length of exposure, method, and main findings. Data were entered into a Word document and Excel spreadsheet for ease of handling and analysis.

Findings

The initial search yielded 4923 results (Fig. 2). All search results were entered into Endnote. After removal of duplicates and screening of titles and abstracts, 4738 did not meet the inclusion criteria. The remaining 185 articles were obtained in full and were assessed for their relevance to the research question. Of these, 131 were excluded for reasons such as: postgraduate (residency) exposure, broadly focused workforce initiatives, and commentaries. Fifty-four articles were included in the final review.

Figure 2 Number of results



Study characteristics

The characteristics of the articles were categorised; when available, data about the placement were collected. The majority of the studies reported data from Australia (n=26) and USA (n=15). Other countries included Canada (n=7), UK (n=4), New Zealand (n=1), South Africa (n=1), and Japan (n=1). The majority of the studies had been published after 2000 (n=51), 25 of which were published during or after 2008.

There were single (n=24) and multiple cohort studies (n=26). Most of the papers reported data from one institution (n=49), with just five collecting data from two or more institutions. There were 31 papers reporting quantitative data, 10 papers reporting qualitative data and 13 reporting both. The majority of the studies reported data from placements in rural and remote areas (n=47). Eight studies included a sample from urban initiatives.

The reported length of exposure varied from 2 weeks to 104 weeks. There were 18 papers that reported data from placements less than 7 months long, ten of these were ≤ 6 weeks and one was 2 weeks long. Twenty-nine studies reported data from placements that were 7 months or longer in duration.

From the data that could be extracted, 24 had voluntary placements and three had mandatory placements. The clinical experiences were commonly reported from the penultimate year of the medical degree (n=28). Of the identifiable graduate entry schemes, exposure was provided in year 3 in 14 studies, both year 3 and 4 in two. Of the identifiable undergraduate schemes, one placement was in Year 4 and two were in Year 5. The studies were primarily evaluations of programmes.

Themes

Four main themes were identified: student performance, career pathways, student perceptions, and supervisor experiences. Some papers relate to multiple themes.

Student performance

The most objective way to demonstrate performance of students taking placements in non-traditional areas is from educational outcomes. Objective Structured Clinical Examinations (OSCE) are one of the most widely recognised examination tools in medical student assessment²¹ and were the most commonly reported exams.^{4, 8, 22-25} Other measures reported were National Board of Medical Examiners subject examinations (NBME)^{6, 8} and United States Medical Licensing Examinations (USMLE).^{6, 26} The common finding across assessment types was that students' scores did not significantly differ by taking a non-traditional under-served area placement (See table 3).^{6, 22, 27-30} The studies were mainly conducted in America and Australia in relation to rural areas.^{6-8, 27, 28} Cohorts have been large (n>200) and over numerous years (5 years).^{8, 24}

Table 3. Studies that have assessed the performance of students taking placements in non-traditional areas compared to students in traditional areas.

Exam	Outcome	Source (Author/year)
OSCE	Non-traditional higher	Bianchi <i>et al.</i> (2008) ⁴ Power <i>et al.</i> (2006) ²² Worley <i>et al.</i> (2000) ²
	Equivalent	Power <i>et al.</i> (2006) ²² Zink <i>et al.</i> (2010a) ⁸ Bianchi <i>et al.</i> (2008) ⁴
	Non-traditional lower	Power <i>et al.</i> (2006) ²²
NBME	Non-traditional higher	
	Equivalent	Zink <i>et al.</i> (2010a) ⁸ Schauer & Schieve (2006) ⁶ Lacy <i>et al.</i> (2007) ²⁷
	Non-traditional lower	Zink <i>et al.</i> (2010a) ⁸
USMLE	Non-traditional higher	Smucny <i>et al.</i> (2006) ²⁶
	Equivalent	Schauer & Schieve (2006) ⁶
	Non-traditional lower	
End of year exams	Non-traditional higher	Worley <i>et al.</i> (2004) ²⁴ Waters <i>et al.</i> (2006) ³⁰ Schauer & Schieve (2006) ⁶
	Equivalent	Margolis <i>et al.</i> (2005) ²⁸ Lacy <i>et al.</i> (2007) ²⁷ Waters <i>et al.</i> (2006) ³⁰ Bianchi <i>et al.</i> (2008) ⁴ Zink <i>et al.</i> (2010a) ⁸
	Non-traditional lower	

There has been some pattern of increased clinical proficiency scores among non-traditional placement students.^{4, 6, 7, 26, 30} Non-traditional students demonstrated better mastery of rapport building, greater knowledge, and had an effective patient encounter routine unlike traditional students.²³

Conversely, non-traditional students' book knowledge was significantly worse than that of the traditional students in two studies.^{8, 22} This may be in relation to improved clinical scores as the students spent more time dealing with clinical issues and less time on self-directed learning.²³

Students who took their rural rotation during the second semester scored higher than those who took it in the first semester;²⁷ and those who took exams during the first 3 months of the year had lower scores.⁸ Timing of the placement has been found to have an impact on grade scores although research is severely lacking in this area.

Career pathway

Educating students who will eventually return to the area is imperative. Students experiencing undergraduate exposure and having a rural background themselves reported a significantly greater likelihood of entering rural general practice.^{26, 31-34} This was found at various stages including career intent, both pre and post placement, and employment as a qualified doctor. Pre and post research designs found a positive shift in preference for considering rural general practice.^{31, 35} All students (regardless of background) were encouraged towards rural practice,³⁶ this was observed similarly elsewhere.^{31, 32, 34, 37}

The lasting effect of exposure is under-researched. Between 1971 and 2007, following a 9 month rural placement, 82% of graduates chose primary care careers and of those in practice 44% have been employed in rural settings all of the time.³³ Lynch *et al.* found 77% of students went on to work in primary care and 42% in community hospitals (after a community experience) compared to 49% and 25% respectively of those who had not undertaken community experience.³⁸

One of the few studies that collected data on a mandatory placement reported around 40% of students would practice rurally for a short time or consider it in the future; so even those who did not volunteer to be involved were still positively influenced.³⁹ Length of exposure may be a factor influencing career choice.⁴⁰ A longer rural clinical experience (2 years vs. 1 year) was found to be more effective in eventual choice of workplace location.³²

Student perceptions

Students' valuing of placements in under-served areas may underpin objective outcomes such as performance and career pathway. These findings are mainly from qualitative interview studies which provide detailed insight.^{2, 11, 29, 41-43} Pre-placement reasons for students embarking on placements included: teaching reputation, to experience remote and rural medicine, lifestyle factors, and breadth of opportunity for educational development.^{29, 44} Negative issues mentioned pre-placement were the nature of rural consultations not providing appropriate material, financial support, and social dislocation.^{44, 45}

Many positive experiences were described by students. They felt integrated with the community, developed a psychosocial understanding, increased social responsibility, gained awareness of context and community, developed teamwork skills, and improved problem-solving.^{11, 35, 39, 46} By increasing responsibility for patient care over a period of time, continuity of the placement allows a student to learn about the whole life cycle of health and develop well-rounded clinical competence and practical skills.^{3, 11, 47} The immersion experience facilitates closer relationships with colleagues.⁴⁷ In South Africa students developed a holistic approach to primary care, could see inefficiencies in the health system, and increased capability to deal with undifferentiated patients.³ Students perceived improvements to their confidence and self-esteem^{3, 11, 35, 48, 49} and expressed satisfaction with rural exposure.^{36, 39} Confidence, enjoyment, and self-belief are important factors in behavioural change and motivation.⁴⁸

Students have also had negative experiences of placements. Around 15-25% of students perceived various aspects of their placement to be mediocre or poor.⁵⁰ Students reported disliking the possibility of "bumping into" patients in the community, lack of placement structure, learning objectives not being met, limited opportunity to

consult with patients alone, logistical accommodation issues, and anxiety arising from social isolation.^{39, 41, 42} Initially students were concerned about teaching quality, but by the second cohort students found GPs to be excellent teachers.²

Supervisors' experiences

Research has investigated supervisors' experiences of undergraduate teaching; to understand this perspective may facilitate future GP roles as they are crucial in medical education.

GPs were motivated to become involved by the prospect of giving students the opportunity to experience remote and rural medicine.⁴¹ Supervisors have intrinsic motivation (enjoyment, developing professional skills) and they, like students, were satisfied with their involvement.⁵¹ Quantitative and qualitative research found continuing medical education,⁵² positive impact for learning,⁴² and refining practice⁵¹ were benefits supervisors experienced. A tangible benefit, receiving a personal digital assistant computer, was well received.⁵³

A negative perception cited by supervisors was being uncertain about how their teaching fitted into the overall curriculum.^{2, 50} Supervisors believed their role was not clearly defined and students had little understanding of what they needed to learn. This may not be through inefficient GP teaching skills but through a lack of curriculum development, and objectives not matching placement content.

There is an indication that students can have a negative impact on GP income^{26, 51, 52} yet the extent is unknown. This is particularly important where healthcare is not subsidised. Supervisors believe it takes time before a student becomes a benefit to a practice rather than a burden.⁴⁶ Using an objective measure (time), one study showed supervisors effectively distribute time allocated to consultation tasks differently when supervising students.⁵⁴ In another study, mean length of time spent by GP per consultation decreased from 14.4 minutes to 9.5 minutes when a student was present.⁵⁵

Discussion

Summary of findings

The review found undergraduate exposure to under-served areas has multiple beneficial implications for stakeholders. Studies were frequently from countries with large rural areas, namely America, Australia, and Canada, and driven by a need to address shortages of rural doctors. Subsequently the majority of the findings have come from rural areas, with little data from other under-served areas.

A consistent finding was that students' exam scores did not significantly differ by taking a non-traditional under-served area placement.²⁷⁻³⁰ There was a tentative pattern of higher grades among non-traditional placement students in areas such as clinical proficiency and rapport with patients,^{4, 6, 26, 30} however this was not substantiated by all studies.^{8, 22}

The studies found that all students (regardless of background) were more likely to undertake a rural post after a community placement.^{31, 32, 34, 36, 37} Student experiences included a deeper understanding of primary care, breadth of opportunity, developing responsibility over time, and integrating with the community.^{3, 11, 47} Students were concerned about consultations not providing appropriate material, learning objectives not being met, and logistical issues.^{39, 41, 42}

Supervisor experiences included giving something back to medical education, professional development, and refining practice.^{41, 51, 52} Supervisors were sometimes unclear how their teaching fitted the curriculum, had nebulous roles, and felt unprepared,^{2, 50} highlighting the need for faculty development.

Findings in context

Collectively the research supports longer term placements to help students integrate, embed, and develop emotional attachment to community life.⁴⁶ However, both students and supervisors raised concerns about meeting curriculum requirements.^{2, 50} Existing learning objectives may not readily adapt to non-traditional placements hence provoking this concern. Performance equivalency is a pragmatic objective although it may detract focus from the holistic development of the student professional identity.⁴⁷

The expansion of programmes in countries including Australia, New Zealand, USA, and Canada demonstrates the sustainability of running under-served curricula; supporting replication to other contexts. Although most studies report data from one institution, collectively this review provides an evidence base. If initiatives are implemented and evaluated concurrently at multiple institutions this may substantiate findings. Similarities between programmes in different continents (North America and Australia) have been observed conjointly¹¹ so the initiatives may translate to different contexts.

The UK has less of a rural workforce issue but there are doctor shortages in areas of deprivation⁵⁶ often found in inner-cities and areas that have endured post-industrial collapse.⁵⁷ Hays⁵⁷ review of medical education in Europe suggested the application of Australian rural initiatives may be feasible but issues of transferability are largely untested. Under-served area placements may provide students with a holistic appreciation of medicine, however it has been suggested medical school experience has discouraged interest to practise in inner-cities.⁵⁸ The success of initiatives is demonstrated mainly in rural areas^{6, 28, 35, 43} while the application to contrasting contexts with nonetheless similar issues has not been widely acted upon.

Research finding educational equivalency of non-traditional placement students demonstrates a major strength; however, caution should be taken about learning in different contexts. Equivalency studies are often analysed using ANOVAs, with a non-significant finding indicating two groups are not significantly different. This does not imply they are the same⁵⁹ yet comparability of placements has often been concluded following a non-significant finding.^{4, 30}

Some studies indicate higher exam scores for students taking non-traditional placements^{4, 24, 30} but this has not been consistently replicated as most demonstrate equivalency. Within studies that found higher scores, the placement characteristics differ. In contrast, placements that concluded performance equivalency also differ. Comparative qualitative research could conceptualise programmes where students do better rather than equivalently to understand why this may be the case.

Research indicates that students do return to work in the area^{33, 34, 38} but longer term data are required. The benefits of undergraduate programmes may be lost if postgraduate training provides insufficient exposure to under-served areas.⁶⁰ Positive changes in career trajectory towards under-served areas do appear to happen but whether this would occur without exposure is unclear. A placement enables students to achieve personal goals and enhance self-efficacy beliefs towards the complex demands of rural practice according to socio-cognitive career theory.⁶¹

Limitations of studies

Many studies suffer from similar methodological and contextual constraints. The placements were often voluntary and pilots therefore samples were small, from one cohort, and were not randomized. Randomly assigning students to groups would counteract self-selection bias but it is ethically and morally challenging to make interventions mandatory purely for sampling robustness. A recurring limitation was collecting data from one medical school only.^{4, 6, 27, 62} The innovation may have been implemented differently from one school to the next, affecting the student experience.

The literature is lacking placement characteristic detail as contextual factors are sometimes described in brevity or omitted. Contextual information regarding prevalent health outcomes, deprivation indices, and population doctor ratios would be valuable for comparisons. Inaccuracies may occur if comparing placements of supposed similar length or locality when in reality they are not. Factors such as admittance (mandatory or voluntary; graduate or non-graduate) may be fundamental to outcomes. Most studies reported graduate-entry degrees which may have been a confounding variable. Many studies did not stringently assess or match students prior to the placement. Students may have predisposed attributes that provoke appeal to under-served area placements; while student background and career intent are well-established,¹² there has been little investigation into personality profiles (e.g. altruism, dealing with uncertainty).

Limitations of the review

A possible weakness was the search strategy having a very large number of results. A review⁶³ with similar search terms initially yielded nearly 7000 citations. The use of educational search terms is liable to identify a high number of results given the vast education literature. The balance between sensitivity and specificity is a complex challenge with no perfect outcome. As the technical development and accessibility of electronic databases expands, the relevant literature simultaneously unveils, which makes comprehensive reviews increasingly demanding. There were also difficulties in separating details about placements from the studies e.g. distilling exposure information from medical schools with multiple components (admissions, modules).

Conclusions

This review builds on the literature, taking a collective approach to under-served, community area placements incorporating objective and subjective data, with a view to extending knowledge beyond rural areas.

The placements identified benefits for students developing their clinical knowledge, confidence, interpersonal skills and increasing the likelihood of them returning to work in the area. To provide a holistic appreciation of medicine and develop professional capabilities are principles that may benefit all medical students, regardless of their future roles.

There is a growing amount of evidence for rural, under-served areas but there is little in relation to inner-city, deprived areas, and none in the UK.

Contributors: PC made a substantial contribution to the design, acquisition, analysis and interpretation of the literature. He was responsible for creating the first draft of the article. JMcL and JI made a substantial contribution to the original conception and design of the study, and to the revision of the first draft of the paper. All authors approved the final manuscript for submission.

Acknowledgements: We would like to thank our colleagues from the Centre for Medical Education Research, Durham University for their valuable comments.

Funding: PC's position is funded through a PhD stipend from Durham University. The funding source had no involvement in the study.

Competing interests: none

Ethical approval: not applicable

Appendix A

MEDLINE was searched using the PubMed interface on 10/11/11 for the period 1991 to 2011

Search Strategy:

-
1. Exp Medical education/ (111949)
 2. Students, Medical/ (50448)
 3. Education, Medical, Undergraduate/ (27987)
 4. Student*. Ti, ab (172149)
 5. Medical training. Ti, ab (2737)
 6. Curriculum. Ti, ab (656968)
 7. Trainee(s). Ti, ab (8028)
 8. Medic. Ti, ab (2600)
 9. 1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 (1032866)
 10. Placement. (69,861)
 11. Program/ OR programme/ (276174)
 12. Clinical Clerkship/ (3727)
 13. Longitudinal. Ti, ab (144147)
 14. Integrated. Ti, ab (116293)
 15. "Longitudinal clerkships". (72)
 16. "Integrated clerkships". (10)
 17. Attachment/ (77705)
 18. (Extended adj4 placement) (1003)
 19. 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 (688992)
 20. Exp medically under-served area/ (7713)
 21. Rural. Ti, ab (43068)
 22. Residence Characteristics/ (363446)
 23. Deprived. Ti, ab (19913)
 24. Remote. Ti, ab (37599)
 25. (Inner adj3 city). Ti, ab (8140)
 26. Indigenous. Ti, ab (16199)
 27. Poor. Ti, ab (301427)
 28. Underprivileged. Ti, ab (7745)
 29. Destitute. Ti, ab (131)
 30. Difficult. Ti, ab (219436)
 31. Isolated. Ti, ab (675038)
 32. 20 OR 21 OR 22 OR 23 OR 24 OR 25 OR 26 OR 27 OR 28 OR 29 OR 30 OR 31 (1699855)
 33. General Practice/ (38460)
 34. GP. Ti, ab (26553)
 35. General Practitioner. Ti, ab (12943)
 36. Primary care practitioner. Ti, ab (212)
 37. Primary healthcare/ (1631)
 38. Exp Rural health services/ (100505)

- 39. Exp Urban health services/ (116462)
- 40. Primary care. Ti, ab (67145)
- 41. "Rural medical practice". Ti, ab (45)
- 42. "Inner city health service". Ti, ab (0)
- 43. "Inner city medical practice". Ti, ab (3)
- 44. Family medicine. Ti, ab (23956)
- 45. 33 OR 34 OR 35 OR 36 OR 37 OR 38 OR 39 OR 40 OR 41 OR 42 OR 43 OR 44
(387703)
- 46. Nursing/ (1086263)
- 47. Dentistry/ (775347)
- 48. Pharmacy/ (149750)
- 49. 46 OR 47 OR 48 (2011360)
- 50. 9 AND 19 AND 32 AND 45 (3294)
- 51. 50 NOT 49 (2758)
- 52. LIMIT 51 to yr= "1991 - 2011" AND English (2293)

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